CTEH CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Mission Incident
Santa Paula, CA
Preliminary Summary of Air Monitoring Results
January 1, 2015

Prepared by
Center for Toxicology and Environmental Health, L.L.C. (CTEH®)

CTEH CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Introduction

Center for Toxicology and Environmental Health, LLC (CTEH®) continued air monitoring in support of response activities following a vacuum truck explosion and fire in Santa Paula, CA.

This submittal summarizes air monitoring data for January 1, 2015 07:00 to January 2, 2015 07:00.

Real-time Air Monitoring

All instrumentation was calibrated at least once per day or per manufacturer's recommendations. Manually-logged real-time air monitoring was conducted for ammonia (NH_3), chlorine (Cl_2), hydrogen sulfide (H_2S), hydrochloric acid (HCl), percent of the Lower Explosive Limit (LEL), oxygen (O_2), peroxides, particulate matter (10 micron particles, PM_{10}), sulfur dioxide (SO_2), sulfuric acid (H_2SO_4), and volatile organic compounds (VOCs), with instruments such as Gastec® pumps with chemical-specific colorimetric tubes, RAESystems® MultiRAE Plus and MultiRAE Pro PID with chemical-specific sensors, and TSI® AM510s for particulate matter. Monitoring was conducted by CTEH® personnel in the work area, at fixed locations in the surrounding community, and along the perimeter of the facility in the community. Table 1 summarizes monitoring data for manually-logged real-time readings. Maps including the site location, fixed community real-time air monitoring locations, aerial site photo, and roaming monitoring are included in Appendix A. Unified Command determined that community air monitoring would be discontinued as of 06:00 on January 2, 2015.

CTEH® monitored RAESystems© AreaRAE units with ProRAE Guardian system at four locations on the fence line of the facility within the work area. Additional units (Unit 09 and Unit 10) were deployed in the cabs of excavators supporting solidification and waste removal operations in the Exclusion Zone. AreaRAE Unit 11 was deployed on Mission Rock Road on the outer fence line of the Santa Clara Waste Water facility primarily to monitor Cl_2 concentrations between the 120 barrel tank truck and the road. AreaRAEs were equipped with sensors to detect Cl_2, VOCs, LEL, H_2S, and SO_2. Unit 09 detected Cl_2 up to 0.2 ppm, and Unit 10 detected Cl_2 concentrations up to 0.3 ppm. Excavator operators were in an air-purifying respirators (APR) during this period. Unit 11 detected Cl_2 up to 0.4 ppm, however detections were not sustained. Table 2 summarizes monitoring data for AreaRAE monitoring. AreaRAE graphs displaying real-time air monitoring data as well as 15-minute rolling averages and a map depicting AreaRAE locations are included in Appendix B.

Particulate monitors were collocated with AreaRAE units 01, 02, 03, and 04 and data-logged to monitor PM_{10}. Additional monitors were data-logged in the cabs of excavators supporting solidification operations in the exclusion zone. Table 3 summarizes data-logged particulate monitoring data.

Table 1: Manually-Logged Real-Time Air Monitoring Summary[1]
January 1 2015 07:00 – January 2, 2015 07:00

Location Category	Analyte	Instrument	No. of Readings	No. of Detections	Avg. of Detections	Detection Range[2]
Community	Cl_2	Gastec 8La	7	0	NA	<0.05 ppm
	H_2S	MR+ / MR Pro	23	0	NA	<1 ppm
	HCl	Gastec 14L	8	0	NA	<0.05 ppm
	LEL	MR+ / MR Pro	23	0	NA	<1 %
	O_2	MR+ / MR Pro	23	23	20.9	20.9 - 20.9 %
	Peroxides	Gastec 32	5	0	NA	<0.1 ppm
	PM_{10}	AM510/Dusttrak	23	23	0.021	0.012 - 0.044 mg/m^3
	SO_2	MR+ / MR Pro	23	0	NA	<0.1 ppm
	H_2SO_4	Gastec 35	6	0	NA	<0.2 mg/m^3
	VOC	MR+ / MR Pro	23	0	NA	<0.1 ppm
Exclusion Zone	Cl_2	MR+ / MR Pro	1	0	NA	<0.1 ppm
	H_2S	MR+ / MR Pro	1	0	NA	<1 ppm
	LEL	MR+ / MR Pro	1	0	NA	<1 %
	O_2	MR+ / MR Pro	1	1	20.9	20.9 - 20.9 %
	SO_2	MR+ / MR Pro	1	0	NA	<0.1 ppm
	VOC	MR+ / MR Pro	2	0	NA	<0.1 ppm
Work Area	Cl_2	MR+ / MR Pro	24	0	NA	<0.1 ppm
	H_2S	MR+ / MR Pro	19	0	NA	<1 ppm
	LEL	MR+ / MR Pro	25	0	NA	<1 %
	NH_3	Gastec 3L	1	0	NA	<0.2 ppm
	O_2	MR+ / MR Pro	19	19	20.9	20.9 - 20.9 %
	Peroxides	Gastec 32	1	0	NA	<0.1 ppm
	PM_{10}	AM510/Dusttrak	7	7	0.065	0.01 - 0.254 mg/m^3
	SO_2	MR+ / MR Pro	25	0	NA	<0.1 ppm
	H_2SO_4	Gastec 35	1	0	NA	<0.2 mg/m^3
	VOC	MR+ / MR Pro	25	0	NA	<0.1 ppm

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*
[2]*Maximum detections preceded by the "<" symbol are considered non-detects below reporting limit to the right.*

Table 2: AreaRAE Air Monitoring Summary[1]
January 1 2015 07:00 – January 2, 2015 07:00

Unit ID	Analyte	No. of Readings	No. of Detections	Avg. of Detections	Detection Range[2]
Unit 01	H_2S	4872	45	0.1 ppm	0.1 - 0.7 ppm
	LEL	4872	0	NA	< 1 %
	SO_2	4872	35	0.1 ppm	0.1 - 0.1 ppm
	VOC	4872	0	NA	< 0.1 ppm
Unit 02	H_2S	5332	4	0.1 ppm	0.1 - 0.2 ppm
	LEL	5332	0	NA	< 1 %
	SO_2	5332	0	NA	< 0.1 ppm
	VOC	5332	135	0.1 ppm	0.1 - 0.2 ppm
Unit 03	H_2S	5360	0	NA	< 1 ppm
	LEL	5360	0	NA	< 1 %
	SO_2	5360	0	NA	< 0.1 ppm
	VOC	5360	8	0.1 ppm	0.1 - 0.1 ppm
Unit 04	H_2S	5379	0	NA	< 1 ppm
	LEL	5379	0	NA	< 1 %
	SO_2	5379	0	NA	< 0.1 ppm
	VOC	5379	0	NA	< 0.1 ppm
Unit 09	Cl_2	1257	44	0.1 ppm	0.1 - 0.2 ppm
	LEL	1257	0	NA	< 1 %
	SO_2	1257	0	NA	< 0.1 ppm
	VOC	1257	0	NA	< 0.1 ppm
Unit 10	Cl_2	353	33	0.1 ppm	0.1 - 0.3 ppm
	LEL	146	0	NA	< 1 %
	SO_2	353	0	NA	< 0.1 ppm
	VOC	353	2	0.1 ppm	0.1 - 0.1 ppm
Unit 11	Cl_2	5136	183	0.1 ppm	0.1 - 0.4 ppm
	SO_2	5136	0	NA	< 0.1 ppm
	VOC	5136	2	0.2 ppm	0.1 - 0.2 ppm

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*
[2]*Maximum detections preceded by the "<" symbol are considered non-detects below reporting limit to the right.*

Table 3: AM510 PM_{10} Monitoring Summary[1]
January 1 2015 07:00 – January 2, 2015 07:00

Serial No.	Location	No. of Readings	No. of Detections	Avg. Detection	Detection Range
10601072	AR01	3368	3368	0.023	0.009 - 0.476 mg/m^3
10503020	AR02	5106	5106	0.024	0.008 - 0.322 mg/m^3
10704075	AR03	5711	5711	0.026	0.014 - 0.212 mg/m^3
10704074	AR04	5607	5607	0.027	0.003 - 0.202 mg/m^3
10901027	Excavator 200D (AR10)	1544	1544	0.016	0.003 - 0.672 mg/m^3
10704070	Excavator 210G (AR09)	1575	1575	0.025	0.013 - 0.081 mg/m^3

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*

Appendix A

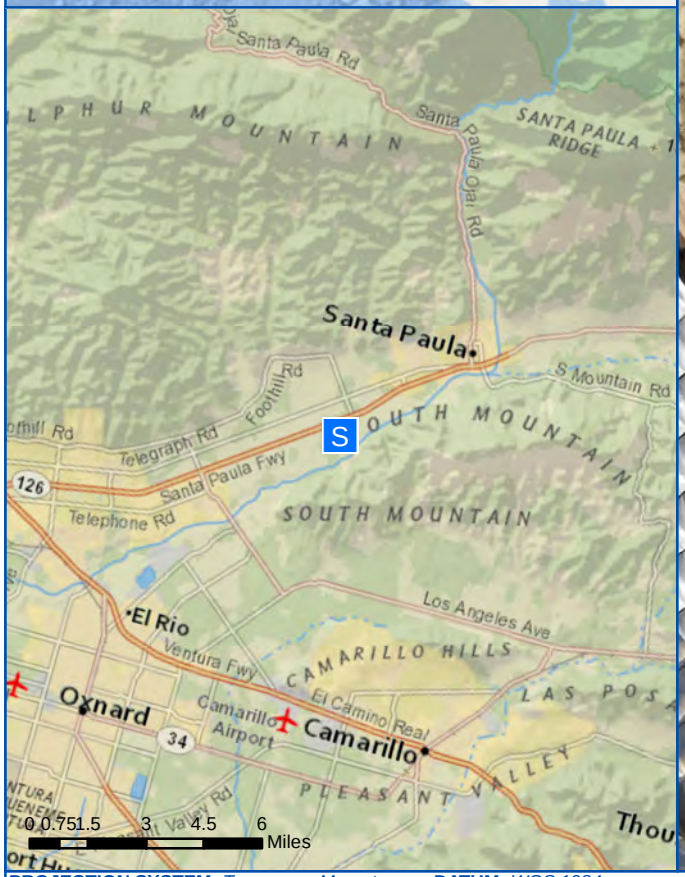
Incident Maps:

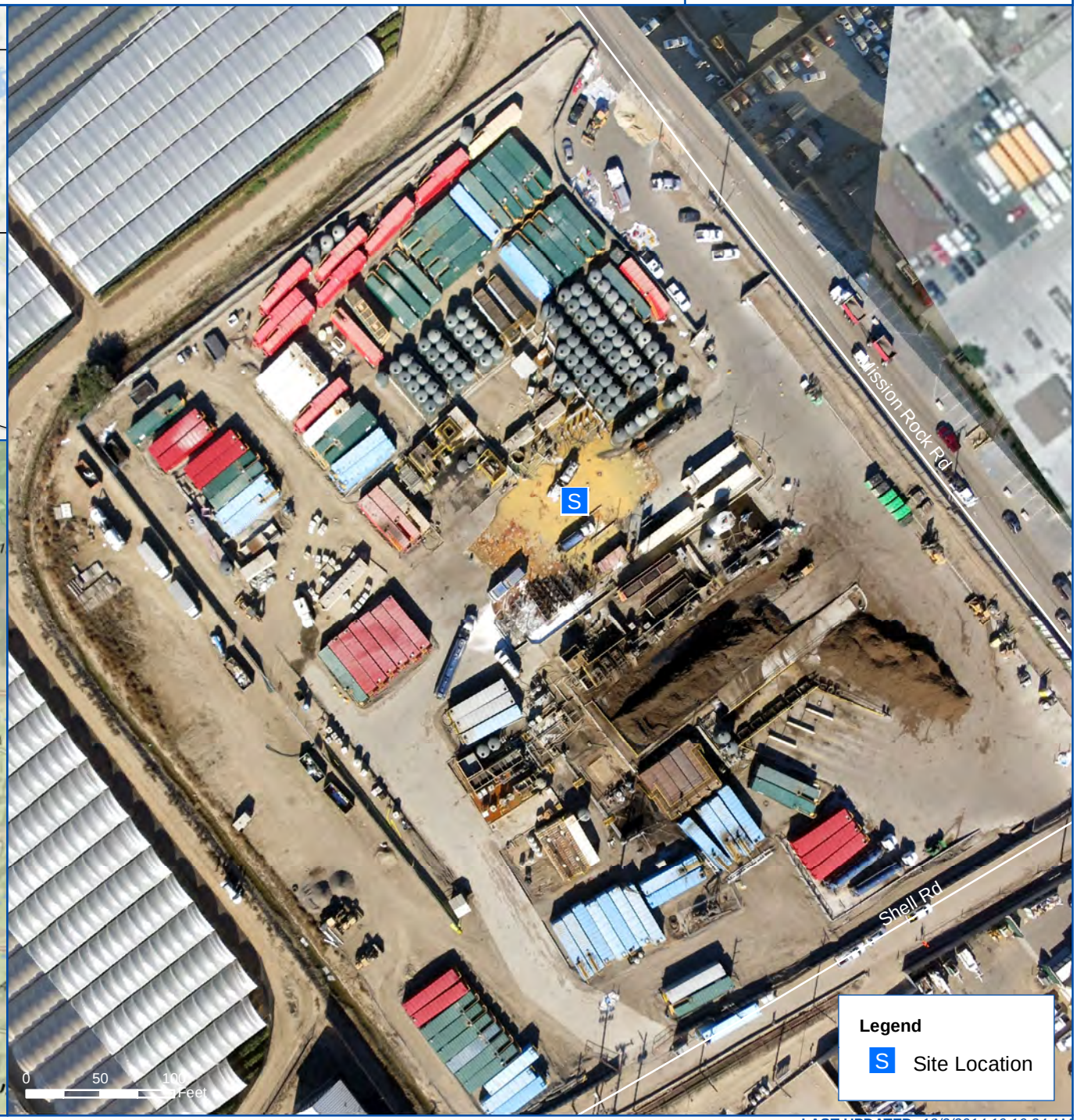
Real-time Air Monitoring Locations and Incident Site

Site Location

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura



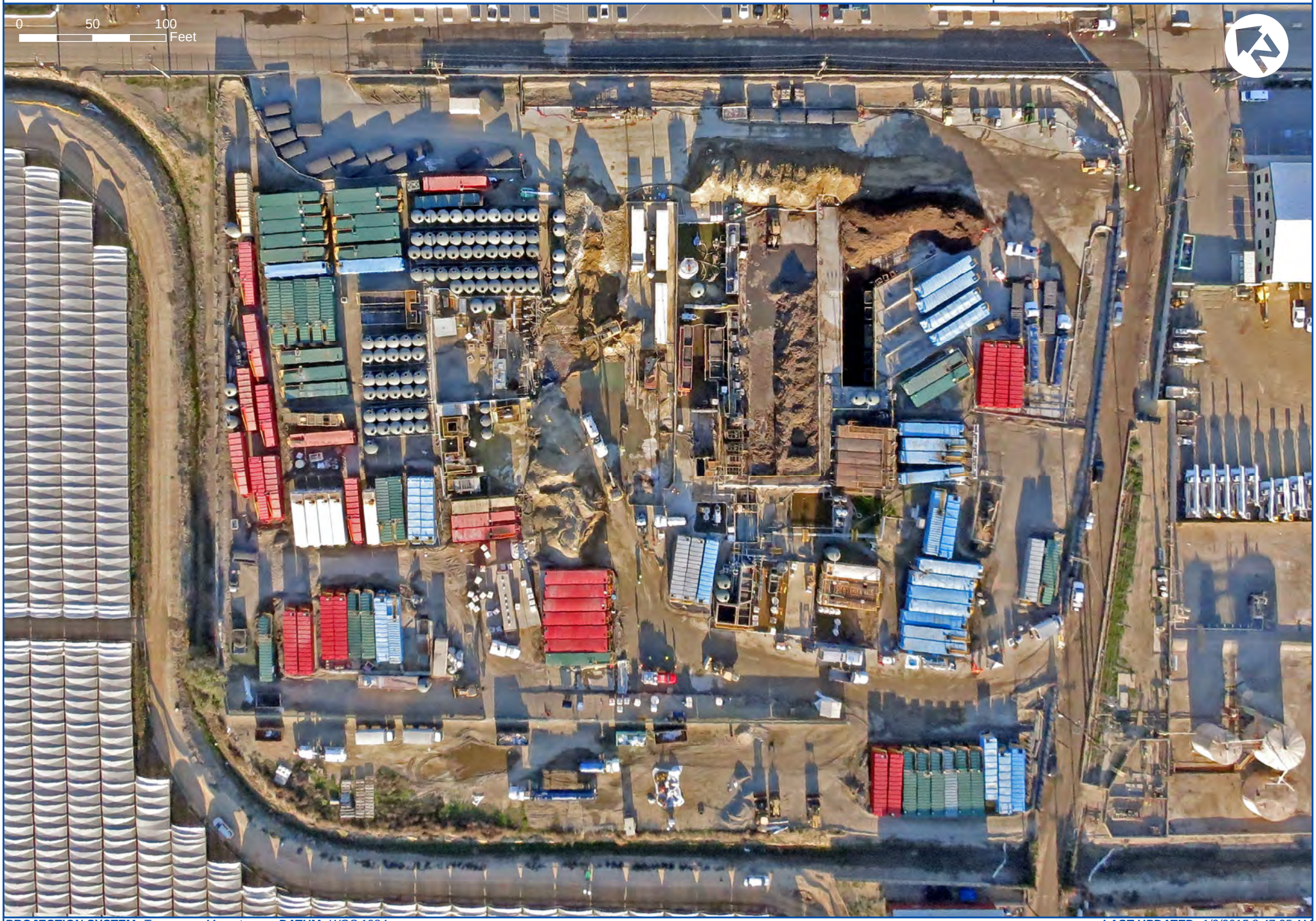


PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/2/2014 10:10:34 AM*

Aerial Overview - 1/01/2015

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura



PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *1/2/2015 8:47:25 AM*

Fixed Community Real-Time Air Monitoring Station Locations

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *11/25/2014 12:22:02 PM*

Manually Logged Real-Time Air Monitoring Concentrations

Cl_2 - Jan 01, 2015 07:00 to Jan 02, 2015 07:00

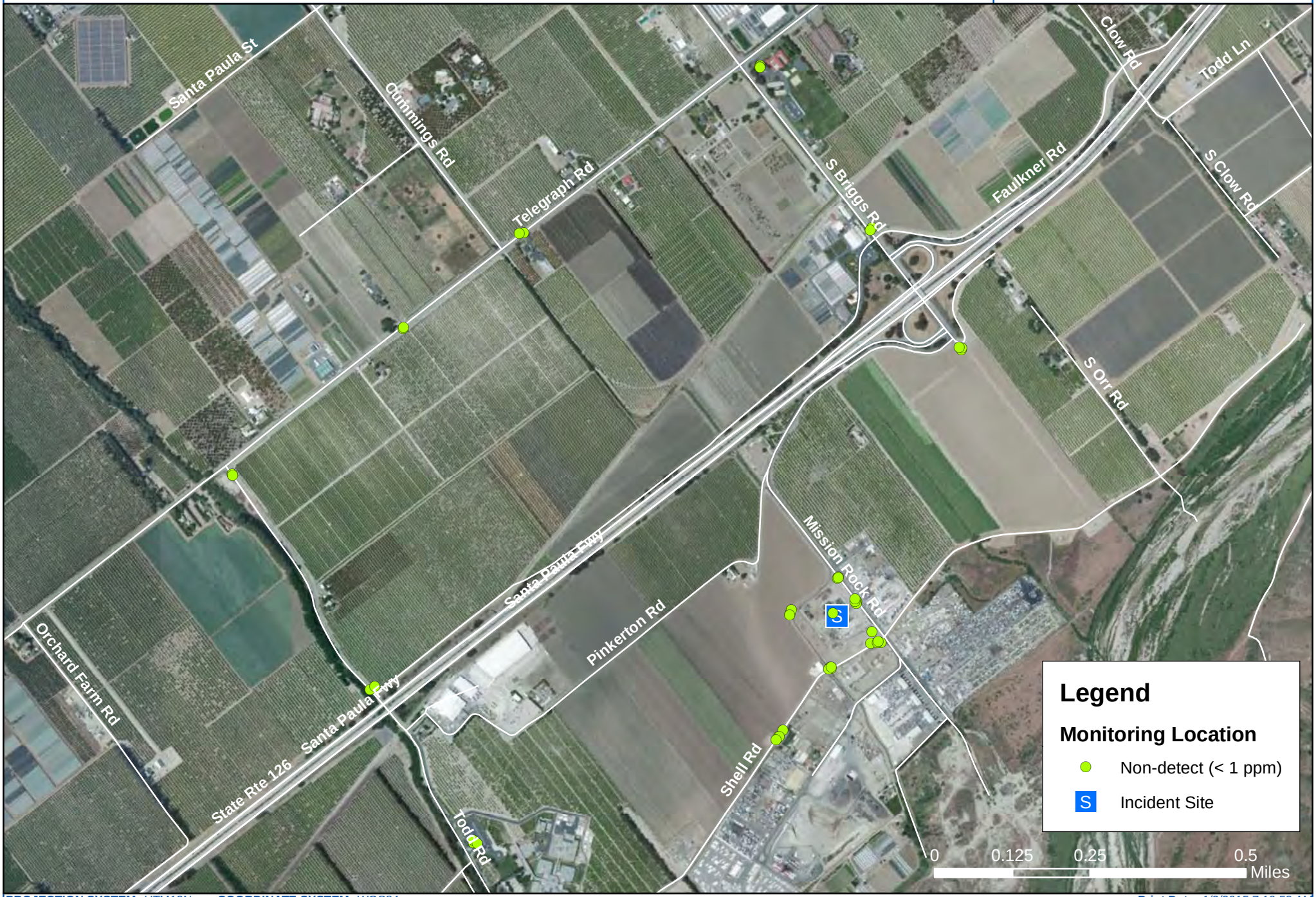
CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84* Print Date: *1/2/2015 7:15:47 AM*

Manually Logged Real-Time Air Monitoring Concentrations

H_2S - Jan 01, 2015 07:00 to Jan 02, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura



PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *1/2/2015 7:16:52 AM*

Manually Logged Real-Time Air Monitoring Concentrations

HCl - Jan 01, 2015 07:00 to Jan 02, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84* Print Date: *1/2/2015 7:17:46 AM*

Manually Logged Real-Time Air Monitoring Concentrations

LEL - Jan 01, 2015 07:00 to Jan 02, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *1/2/2015 7:19:32 AM*

Manually Logged Real-Time Air Monitoring Concentrations

NH_3 - Jan 01, 2015 07:00 to Jan 02, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *1/2/2015 7:20:31 AM*

Manually Logged Real-Time Air Monitoring Concentrations

O_2 - Jan 01, 2015 07:00 to Jan 02, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *1/2/2015 7:21:37 AM*

Manually Logged Real-Time Air Monitoring Concentrations

Peroxides - Jan 01, 2015 07:00 to Jan 02, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84* Print Date: *1/2/2015 7:22:30 AM*

Manually Logged Real-Time Air Monitoring Concentrations

PM_{10} - Jan 01, 2015 07:00 to Jan 02, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *1/2/2015 7:24:12 AM*

Manually Logged Real-Time Air Monitoring Concentrations

SO_2 - Jan 01, 2015 07:00 to Jan 02, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *1/2/2015 7:25:46 AM*

Manually Logged Real-Time Air Monitoring Concentrations

H_2SO_4 - Jan 01, 2015 07:00 to Jan 02, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *1/2/2015 7:29:24 AM*

Manually Logged Real-Time Air Monitoring Concentrations

VOC - Jan 01, 2015 07:00 to Jan 02, 2015 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *1/2/2015 7:31:40 AM*

Appendix B:

AreaRAE Trend Graphs, AM510 Trend Graphs, and Location Map

AreaRAE and AM510 Locations

Mission Incident

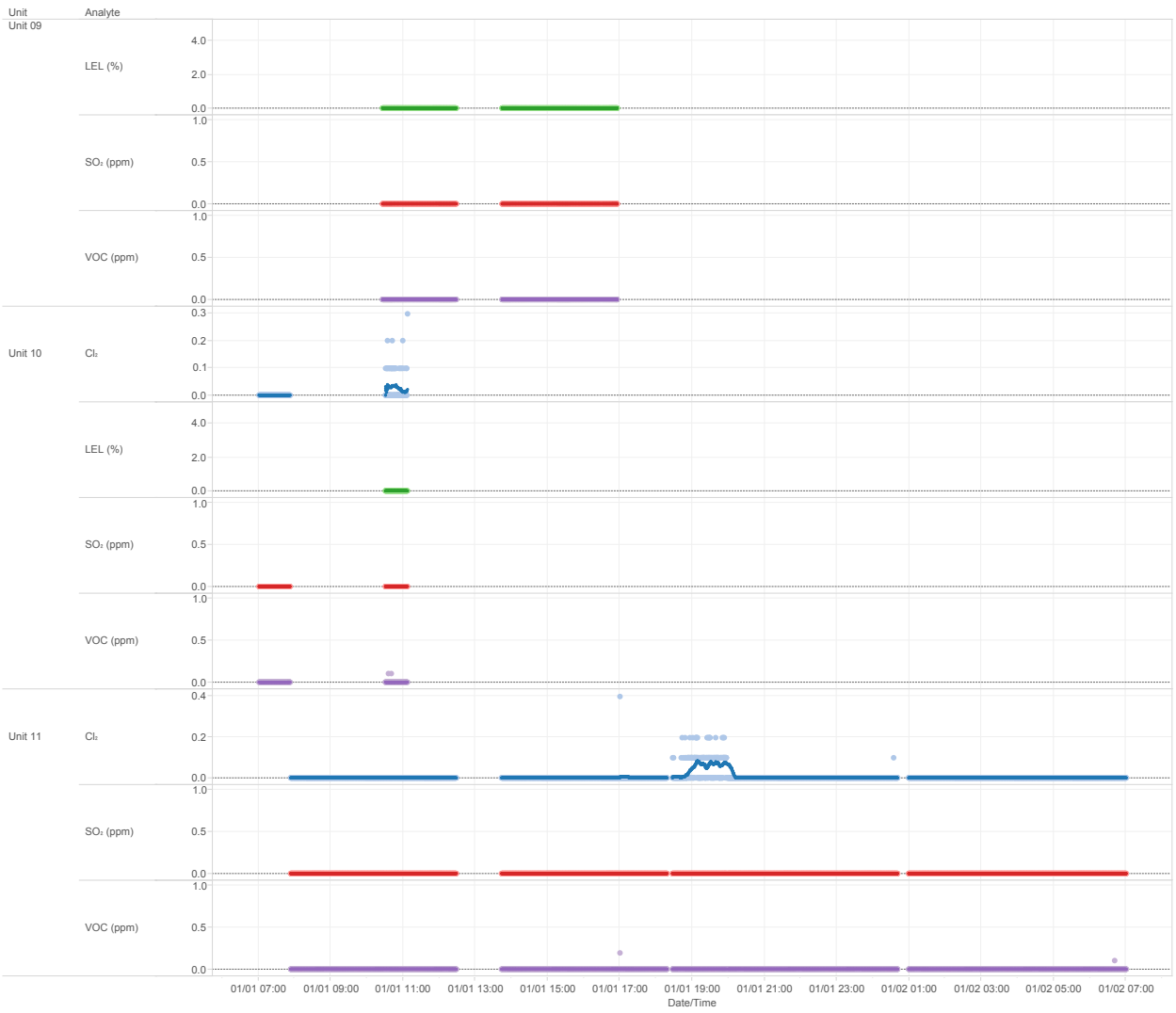
Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *1/2/2015 8:48:45 AM*

Patriot Environmental
AreaRAE Trend Graphs
1/01/2015 07:00 - 1/02/2015 07:00

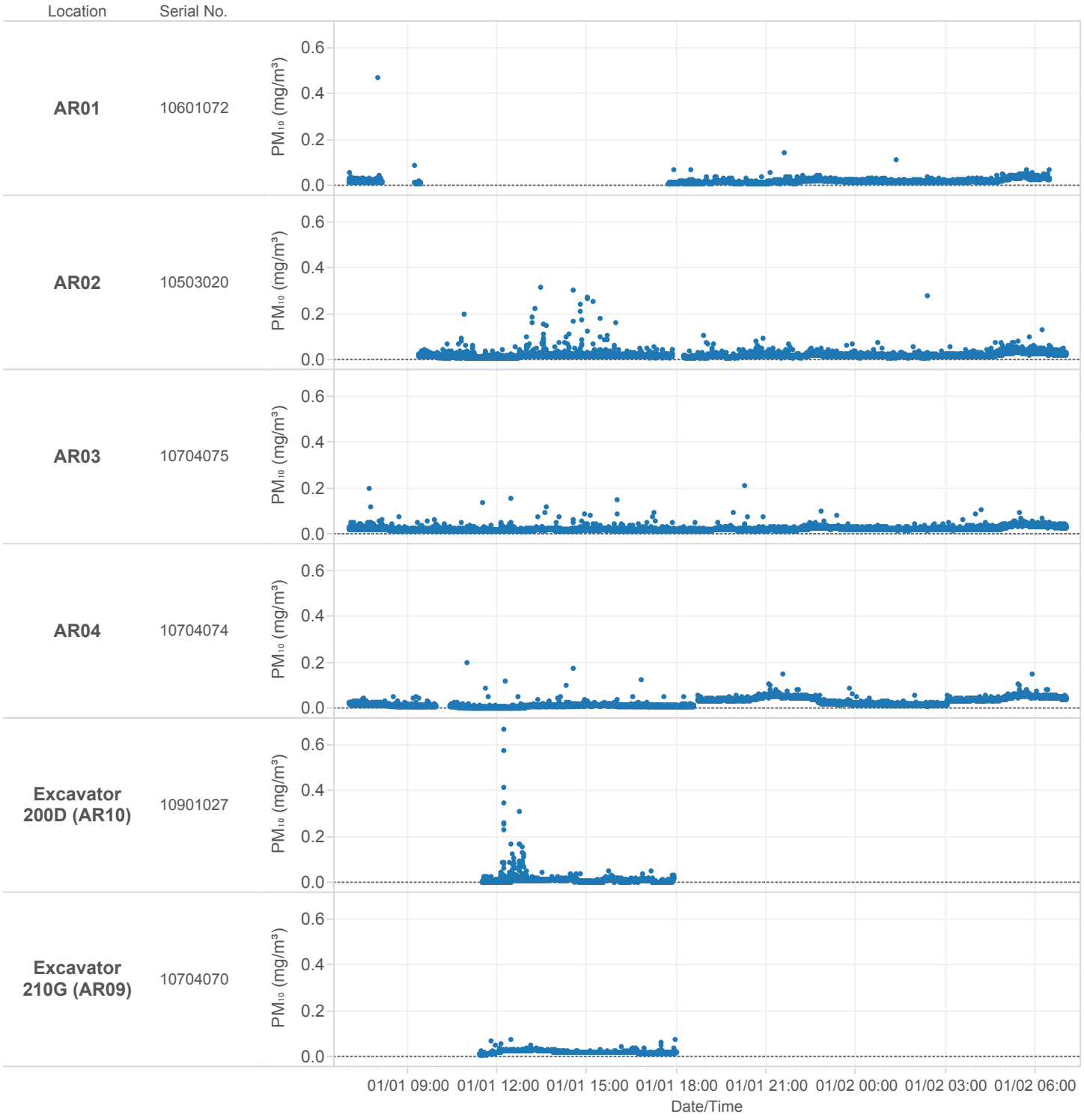
- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format
- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"

Patriot Environmental
AreaRAE Trend Graphs
1/01/2015 07:00 - 1/02/2015 07:00



- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format
- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"

Patriot Environmental
MISSION INCIDENT
Datalogged AM510 (PM_{10}) Summary
1/01/2015 07:00 - 1/01/2015 07:00



- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format